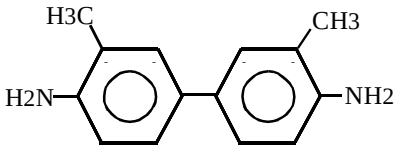
3,3'-DIMETHYL BENZIDINE

3,3'-Dimethyl benzidine is a federal hazardous air pollutant and was identified as a toxic air contaminant in April 1993 under AB 2728.

CAS Registry Number: 119-93-7

Molecular Formula: $C_{14}H_{16}N_2$



3,3'-Dimethyl benzidine occurs as white to reddish crystals or crystalline powder. It is slightly soluble in water, and soluble in alcohol, ether, and dilute acids (Merck, 1983).

Physical Properties of 3,3'-Dimethyl benzidine

Synonyms: o-tolidine; 3,3'dimethyl-[1,1'-biphenyl]-4,4'-diamine; diaminoditolyl; 4,4'-diamino-3,3'-dimethyl-biphenyl

Molecular Weight:	212.28
Boiling Point:	300 °C
Melting Point:	129 - 131 °C
Log Octanol/Water Partition Coefficient:	2.34
Conversion Factor:	1 ppm = 8.68 mg/m^3

(HSDB, 1991; Merck, 1983; U.S. EPA, 1994a)

SOURCES AND EMISSIONS

A. Sources

3,3'-Dimethyl benzidine is used as a sensitive reagent for detection of gold, a curing agent for urethane resins, and a chemical intermediate for azo dyes. It also has been used in small quantities in chlorine test kits by water companies and swimming pool owners and in test tapes in clinical laboratories (HSDB, 1991).

B. Emissions

No emissions of 3,3'-dimethyl benzidine from stationary sources in California were reported, based on data obtained from the Air Toxics "Hot Spots" Program (AB 2588) (ARB, 1997b).

C. Natural Occurrence

No information about the natural occurrence of 3,3'-dimethyl benzidine was found in the readily-available literature.

AMBIENT CONCENTRATIONS

No Air Resources Board data exist for ambient concentrations of 3,3'-dimethyl benzidine.

INDOOR SOURCES AND CONCENTRATIONS

No information about the indoor sources and concentrations of 3,3'-dimethyl benzidine was found in the readily-available literature.

ATMOSPHERIC PERSISTENCE

An estimated atmospheric half-life for 3,3'-dimethyl benzidine in the gas-phase due to reaction with photochemically produced hydroxyl radicals is 1.3 hours (Atkinson, 1995).

AB 2588 RISK ASSESSMENT INFORMATION

3,3'-Dimethyl benzidine emissions are not reported from stationary sources in California under the AB 2588 program. It is also not listed in the California Air Pollution Control Officers Association Air Toxics “Hot Spots” Program Revised 1992 Risk Assessment Guidelines as having health values (cancer or non-cancer) for use in risk assessments (CAPCOA, 1993).

HEALTH EFFECTS

Probable routes of human exposure to 3,3'-dimethyl benzidine are inhalation, ingestion, and dermal contact (U.S. EPA, 1994a).

Non-Cancer: Acute exposure to high levels of 3,3'-dimethyl benzidine may irritate the nose and throat. The United States Environmental Protection Agency (U.S. EPA) has not established an oral Reference Dose (RfD) for 3,3'-dimethyl benzidine and has determined that there are inadequate data for the establishment of a Reference Concentration (RfC). No information is available on adverse reproductive or developmental effects of 3,3-dimethyl benzidine in animals or humans (U.S. EPA, 1994a).

Cancer: No information is available on the carcinogenic effects of 3,3'-dimethyl benzidine in humans. Animals, orally exposed, developed an increased incidence of tumors of the intestine, skin, liver, lung, and other organs. The U.S. EPA has placed 3,3'-dimethyl benzidine in Group B2: Probable human carcinogen based on sufficient animal but no human evidence

(U.S. EPA, 1994a). The International Agency for Research on Cancer has classified 3,3'-dimethyl benzidine in Group 2B: Possible human carcinogen (IARC, 1987a). The State of California under Proposition 65 has determined that 3,3'-dimethyl benzidine is a carcinogen (CCR, 1996).

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